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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/582,341

06/09/2006

Tomoya Sugita

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EXAMINER

BEDTELYON, JOHN M

ART UNIT

PAPER NUMBER

2874

MAIL DATE

DELIVERY MODE

08/02/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/582,341

Applicant(s)

SUGITA ET AL.

Examiner

John M. Bedtelyon

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 June 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 June 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 09/11/06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1, 8 and 13 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claims recite the limitation the paths for transmitting lights through the plural waveguides are curved, but it is unclear from the drawings and specification how they are curved. The drawings and specification teach planar reflective surfaces for changing the light path but no curve. The Examiner believes the term "curve" was erroneously used and interprets the limitation to mean that the light paths of the separate waveguides aren't collinear.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 7 recites the limitation "θ: the minimum beam spread angle possessed by the semiconductor laser" in lines 8-9. There is insufficient antecedent basis for this limitation in the claim, as there is no light source or semiconductor laser in claim 1 or claim 7.

Drawings

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "light incident surface of the optical element is in a curved configuration having curvature" of claim 12 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

6. The disclosure is objected to because of the following informalities: there is inconsistent terminology used for the same structural elements;
7. reference numbers 21 and 22 are "optical coupling parts" in at least paragraph [0066] and [0083], but are referred to as "reflection prisms" in at least paragraph [0095] and also as "optical path coupling parts" in at least paragraph [0115];
8. reference numbers 21a, 22a, 22b, 23b are called "inclined surfaces" in at least paragraph [0067] but are called "optical path coupling parts" in at least paragraph [0121] or "prism" in at least paragraph [0122].

Appropriate correction is required.

9. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1-4 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Stites (US Patent 6,324,330, hereinafter Stites).

With respect to claim 1, Stites teaches:

An optical element (100) comprising: a plurality of waveguides (110a, 110b, 110c) transmitting a light (130);

a plurality of light path coupling parts (110Ea, 110Eb1, 110Eb2, 110Ec) coupling adjacent waveguides so as to optically couple said plural waveguides serially (see figures 5 and 13, column 6, lines 45-54), wherein the paths for transmitting lights through the plural waveguides are curved at least one part of said optical path coupling parts (see figures 5 and 13).

With respect to claim 2, Stites teaches:

An optical element as defined in claim 1, wherein an odd number of waveguides are provided as said plural waveguides, and said odd number of waveguides are disposed overlapping with each other in parallel with respect to the light transmission direction of said waveguides (see figures 5 and 13).

With respect to claim 3, Stites teaches:

An optical element as defined in claim 1, wherein external surfaces other than the light incident surface and the light output surface of the waveguide path comprising said waveguides and said light path coupling parts are coated by a reflection film reflecting the transmitting light (see claims 6 and 7).

With respect to claim 4, Stites teaches:

An optical element as defined in claim 1, wherein said light path coupling parts have inclined surfaces which are inclined with respect to the plain vertical to the light

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transmission direction and are integrated with said waveguides at either or both of said adjacent waveguides (see figures 5 and 13).

With respect to claim 13, Stites teaches:

A two-dimensional image forming apparatus (see figure 13) comprising: a laser light source (410) emitting a laser light;

a space optical modulation part (IP) that modulates a laser light emitted from the laser light source;

and an illumination optical system (400) for illuminating the laser light (450, 130) that is outputted from the laser light source to the space light modulation part (see figure 13), wherein said laser light source (400) has a plurality of waveguides (110a, 110b, 110c) transmitting a light, and a plurality of light path coupling parts (110Ea, 110Eb1, 110Eb2, 110Ec) coupling adjacent waveguides so as to optically couple said plural waveguides serially (see figures 5 and 13, column 6, lines 45-54), and the paths for transmitting lights through the plural waveguides are curved at said optical path coupling parts (see figures 5 and 13).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stites (US Patent 6,324,330, hereinafter Stites).

With respect to claim 8, Stites teaches:

A laser light source (400) comprising a laser (410) and an optical element (100) which emits the laser light which is emitted from said laser with transmitting the same, wherein said optical element includes a plurality of waveguides (110a, 110b, 110c) transmitting light, and a plurality of light path coupling parts (110Ea, 110Eb1, 110Eb2, 110Ec) coupling adjacent waveguides so as to optically couple said plural waveguides serially (see figures 5 and 13, column 6, lines 45-54), and the path of the light for transmitting the light through the plural waveguides are curved at said optical path coupling part (see figures 5 and 13).

Stites is silent to the laser light source being a semiconductor light source.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a semiconductor laser light source as the laser light source as described in the Stites reference, as semiconductor laser light sources are well known in the optical arts and are beneficial because they are inexpensive light sources that are known to be efficient at producing light signals.

With respect to claim 9, Stites teaches:

An optical element as defined in claim 8, wherein there is provided a convex lens (420) or a plano-convex lens which is disposed on an optical path between the semiconductor laser and the optical element and makes the spread angle of the laser light incident to the optical element smaller than the spread angle of the laser light that is emitted from the semiconductor laser (see figure 13).

15. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stites (US Patent 6,324,330, hereinafter Stites), as applied to claim 1 above, in view of Japanese Published Patent Applicant No. Sho.59-180519 (hereinafter '519).

With respect to claims 5 and 6, Stites teaches the limitations of claim 1 as previously stated, and further teaches said waveguides are of a hollow structure (claim 6).

Stites is silent to the hollow structure containing either of gas or liquid and Brownian particles, wherein said Brownian particles are colloid particles.

'519 teaches a container an cigarette smoke injected into the container wherein the cigarette particles float while performing Brownian motion, laser light is irradiated to the particles thereby causing a Doppler shift and thereby the frequency range is broadened. Therefore, the coherency of the laser is reduced, which prevents the generation of interference of the light, which would cause a more even light distribution having a high degree of spatial uniformity ('519, Abstract and translated portions of the text). Smoke particles are colloid particles.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the Brownian particles (cigarette smoke, or the like) as taught by '519 inside the hollow prism waveguides of the Stites device because the particles help reduce the coherence of the laser light, thereby preventing generation of an interference pattern which would increase spatial uniformity of the Stites device, which is highly desirable (column 1, lines 1-26).

16. Claims 10 and 11 rejected under 35 U.S.C. 103(a) as being unpatentable over Stites (US Patent 6,324,330, hereinafter Stites) as applied to claim 8 above, in view of Japanese Published Patent Application No. Sho.58-48013 (hereinafter '013).

With respect to claims 10 and 11, Stites teaches the limitations of claim 8 as previously stated. Stites further teaches a lens (420) (see figure 13) that's used to focus the light into the waveguide (110a).

Stites is silent to the lens being a cylindrical plano-concave lens.

'013 teaches a plano-concave lens (4) (figure 1c) that allows the beam spread angle to be increased or decreased which allows a further way to change (improve) the light intensity distribution to the desired pattern (figure 1c and translated text).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a plano-concave lens as taught in '013 in the Stites device as it allows for further control of the spread of the light beam entering the waveguiding device, and would allow for increased control in the light intensity distribution.

17. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stites (US Patent 6,324,330, hereinafter Stites) as applied to claim 8 above, in view of Japanese Published Patent Application No. Hei.6-51236, hereinafter '236.

With respect to claim 12, Stites teaches the limitations of claim 8 as previously stated.

Stites is silent to the light incident surface of the optical element is curved.

'236 teaches a waveguide (1) with a spherical (curved) light incident surface for the benefit of increasing the uniform intensity distribution of the light passing through the waveguide (1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a curved input as taught by '236 in the device of Stites as the curved input surface would converge light beams that are impinged on the input surface and increase the number of reflections inside the waveguide which improves spatial uniformity of the light.

18. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Published Patent Application No. Hei.8-111107, hereinafter '107, in view of Stites (US Patent 6,324,330, hereinafter Stites).

With respect to claim 13, '107 teaches:

A two-dimensional image forming apparatus (see figure 5, 6, 7 and 9) comprising: a light source (20) emitting a light; a space optical modulation part (320) that modulates a light emitted from the light source; and an illumination optical system for illuminating the light that is outputted from the light source to the space light modulation part (see figures), wherein said light source has a plurality of waveguides (71, 72, 73, 74) transmitting a light, and a plurality of light path coupling parts (81, 82, 83, 84, 85) coupling adjacent waveguides so as to optically couple said plural waveguides serially (see figures), and the paths for transmitting lights through the plural waveguides are curved at said optical path coupling parts (see figures and translated text).

'107 is silent to the light source being a laser light source.

Stites teaches a laser light source (410) for use in a similar spatially uniform light projector (see figure 13).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the light source house (50) of the '107 reference with the laser light source (410) of the Stites reference because the light source (20) in the '107 reference is disposed in a reflective house/mirror (50) at a first focus location, thereby

allowing the mirror (30) to focus the light into the first waveguide (71), wherein the laser source (410) of the Stites reference is more collimated and would increase the coupling efficiency into the waveguide.

The motivation to use the laser light source instead of the light source housing (50) would be to decrease the size of the light source apparatus as a whole and increase the coupling efficiency of light into the waveguide.

With respect to claim 14, '107 teaches:

A two-dimensional image forming apparatus as defined in claim 13 wherein there is provided a projection optical system (330) which projects the light that is emitted from the space optical modulation part (see figure 9).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John M. Bedtelyon whose telephone number is 571-270-1290. The examiner can normally be reached on Monday - Friday, 10:00am - 6:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on 571-272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John Bedtelyon/
Patent Examiner, Art Unit 2874

/Kevin S. Wood/
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